

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A sensor system for detecting an effector or cofactor, comprising:
 - (a) a nucleic acid enzyme, comprising a cofactor binding site and optionally an effector binding site;
 - (b) substrates for the nucleic acid enzyme, comprising first polynucleotides;
 - (c) a first set of particles comprising second polynucleotides, wherein the polynucleotides are attached to the particles at the 3' terminus; and
 - (d) a second set of particles comprising third polynucleotides, wherein the polynucleotides are attached to the particles at the 5' terminus;
wherein the first polynucleotides comprise or are at least partially complementary to the second polynucleotides, and
the first polynucleotides comprise or are at least partially complementary to the third polynucleotides, and
a mixture of (a) the nucleic acid enzyme, (b) the substrates, (c) the first set of particles, and (d) the second set of particles, will form aggregates of the first and second sets of particles, and formation of the aggregates will be at least 95% complete 10 minutes after the mixing.
2. (Original) The sensor system of claim 1, wherein the nucleic acid enzyme comprises DNA.
3. (Original) The sensor system of claim 2, wherein the first set of particles and the second set of particles comprise gold.
4. (Original) The sensor of claim 2, wherein the first set of particles and the second set of particles comprise a material selected from the group consisting of metals, semiconductors and latex.
5. (Original) The sensor of claim 2, wherein the effector or cofactor is selected from the group consisting of nitrogen fertilizers, pesticides, dioxin, phenols, 2,4-

dichlorophenoxyacetic acid, Pb(II), Hg(II), As(III), UO₂(II), Fe(III), Zn(II), Cu(II), Co(II), glucose, insulin, hCG-hormone, HIV, HIV proteins, anthrax, small pox, nerve gases, TNT, DNT, cocaine and antibiotics.

6-16. (Cancelled)

17. (Currently amended) A sensor system for detecting an effector or cofactor, comprising:

- (a) a nucleic acid enzyme, comprising a cofactor binding site and optionally an effector binding site;
- (b) substrates for the nucleic acid enzyme, comprising first polynucleotides;
- (c) a first set of particles comprising second polynucleotides; and
- (d) a second set of particles comprising third polynucleotides; wherein the first polynucleotides comprise or are at least partially complementary to the second polynucleotides,

the first polynucleotides comprise or are at least partially complementary to the third polynucleotides, and

the second set of particles have [a] an average diameter of at least [20] 30 nm, and

a mixture of (a) the nucleic acid enzyme, (b) the substrates, (c) the first set of particles, and (d) the second set of particles, will form aggregates of the first and second sets of particles, and formation of the aggregates will be at least 95% complete 10 minutes after the mixing.

18. (Currently amended) The sensor system of claim 17, wherein the second set of particles have [a] an average diameter of at least [30] 35 nm.

19. (Currently amended) The sensor system of claim [18] 17, wherein the nucleic acid enzyme comprises DNA.

20. (Currently amended) The sensor system of claim [18] 17, wherein the first set of particles and the second set of particles comprise gold.

21. (Currently amended) The sensor of claim [18] 17, wherein the first set of particles and the second set of particles comprise a material selected from the group consisting of metals, semiconductors and latex.

22. (Currently amended) The sensor of claim [18] 17, wherein the effector or cofactor is selected from the group consisting of nitrogen fertilizers, pesticides, dioxin, phenols, 2,4-dichlorophenoxyacetic acid, Pb(II), Hg(II), As(III), UO₂(II), Fe(III), Zn(II), Cu(II), Co(II), glucose, insulin, hCG-hormone, HIV, HIV proteins, anthrax, small pox, nerve gases, TNT, DNT, cocaine and antibiotics.

23-41. (Cancelled)

42. (Currently amended) The sensor system of claim 2, wherein the second set of particles have [a] an average diameter of at least [20] 30 nm.

43. (Currently amended) The sensor system of claim [42] 2, wherein the second set of particles have [a] an average diameter of at least [30] 35 nm.

44. (Previously presented) The sensor system of claim 2, further comprising a buffer.

45. (Previously presented) The sensor system of claim 44, wherein the buffer is selected to have a pH of 6.2 to 10.2.

46. (Previously presented) The sensor system of claim 45, wherein the buffer is selected to have a pH of 7.2 to 9.2.

47. (Previously presented) The sensor system of claim 2, wherein components of the sensor system are in an aqueous solution having an ionic strength of at least 0.20.

48. (Previously presented) The sensor system of claim 2, wherein the nucleic acid enzyme is present at a concentration of at least 0.2 μ M.

49. (Previously presented) The sensor system of claim 2, wherein the first polynucleotides are present at a concentration of at least 1.5 nM.

50. (Currently amended) The sensor system of claim [18] 17, wherein the second polynucleotides are attached to the particles at the 3' terminus and the third polynucleotides are attached to the particles at the 5' terminus.

51. (Currently amended) The sensor system of claim [18] 17, further comprising a buffer.

52. (Previously presented) The sensor system of claim 51, wherein the buffer is selected to have a pH of 6.2 to 10.2.

53. (Previously presented) The sensor system of claim 52, wherein the buffer is selected to have a pH of 7.2 to 9.2.

54. (Currently amended) The sensor system of claim [18] 17, wherein components of the sensor system are in an aqueous solution having an ionic strength of at least 0.20.

55. (Currently amended) The sensor system of claim [18] 17, wherein the nucleic acid enzyme is present at a concentration of at least 0.2 μ M.

56. (Currently amended) The sensor system of claim [18] 17, wherein the first polynucleotides are present at a concentration of at least 1.5 nM.

57. (Currently amended) A sensor system for detecting an effector or cofactor, comprising:

- (a) a nucleic acid enzyme, comprising a cofactor binding site and optionally an effector binding site;
- (b) substrates for the nucleic acid enzyme, comprising first polynucleotides;
- (c) a first set of particles comprising second polynucleotides, wherein the polynucleotides are attached to the particles at the 3' terminus; and

(d) a second set of particles comprising third polynucleotides, wherein the polynucleotides are attached to the particles at the 5' terminus;

wherein the first polynucleotides comprise or are at least partially complementary to the second polynucleotides,

the first polynucleotides comprise or are at least partially complementary to the third polynucleotides, and

the second set of particles have [a] an average diameter of at least [20] 30 nm, and

a mixture of (a) the nucleic acid enzyme, (b) the substrates, (c) the first set of particles, and (d) the second set of particles, will form aggregates of the first and second sets of particles, and formation of the aggregates will be at least 95% complete 10 minutes after the mixing.

58. (Currently amended) The sensor system of claim 57, wherein the second set of particles have [a] an average diameter of at least [30] 35 nm.

59. (Previously presented) The sensor system of claim 57, wherein the nucleic acid enzyme comprises DNA.

60. (Currently amended) The sensor system of claim [58] 57, wherein the first set of particles and the second set of particles comprise gold.

61. (Currently amended) The sensor of claim [58] 57, wherein the first set of particles and the second set of particles comprise a material selected from the group consisting of metals, semiconductors and latex.

62. (Currently amended) The sensor of claim [58] 57, wherein the effector or cofactor is selected from the group consisting of nitrogen fertilizers, pesticides, dioxin, phenols, 2,4-dichlorophenoxyacetic acid, Pb(II), Hg(II), As(III), UO₂(II), Fe(III), Zn(II), Cu(II), Co(II), glucose, insulin, hCG-hormone, HIV, HIV proteins, anthrax, small pox, nerve gases, TNT, DNT, cocaine and antibiotics.

63. (Currently amended) The sensor system of claim [58] 57, further comprising a buffer.

64. (Previously presented) The sensor system of claim 63, wherein the buffer is selected to have a pH of 6.2 to 10.2.

65. (Previously presented) The sensor system of claim 64, wherein the buffer is selected to have a pH of 7.2 to 9.2.

66. (Currently amended) The sensor system of claim [58] 57, wherein components of the sensor system are in an aqueous solution having an ionic strength of at least 0.20.

67. (Currently amended) The sensor system of claim [58] 57, wherein the nucleic acid enzyme is present at a concentration of at least 0.2 μ M.

68. (Currently amended) The sensor system of claim [58] 57, wherein the first polynucleotides are present at a concentration of at least 1.5 nM.

69. (Previously presented) The sensor of claim 2, wherein the effector or cofactor is a heavy metal ion.

70. (Currently amended) The sensor of claim [18] 17, wherein the effector or cofactor is a heavy metal ion.

71. (Currently amended) The sensor of claim [58] 57, wherein the effector or cofactor is a heavy metal ion.